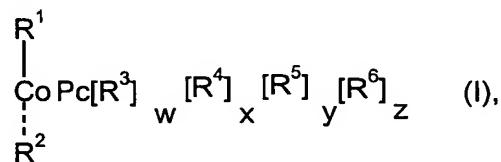


Claims

1. Optical data carriers whose information layer comprises at least one light-absorbent compound which is a Co(III) phthalocyanine in which the Co metal centre bears an axial substituent R¹ and an axial coordinated ligand R², where R¹ is CN, SCN, halogen, in particular Cl, Br or F, alkoxy, aryloxy, arylthio or alkylthio and R² is no ligand or substituted or unsubstituted amine, water, an alcohol, H₂S, a thioalcohol or an isonitrile.
- 5
- 10 2. Optical data carrier comprising, as light-absorbent compound, a phthalocyanine of the formula (I)



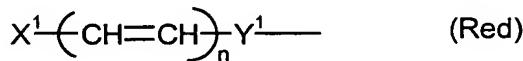
where

- 15 CoPc is cobalt(III) phthalocyanine and R¹ is an axial substituent and R² is an axially coordinated ligand and the radicals R³ to R⁶ are substituents on the phthalocyanine, where
- 20 R¹ is CN, SCN, halogen, alkoxy, aryloxy, arylthio or alkylthio,
- R² is no ligand or NR¹⁷R¹⁸R¹⁹, OR¹⁰R¹¹, SR¹⁰R¹¹ or an isonitrile of the formula IC[⊖]N[⊕]—R,
- 25 R³, R⁴, R⁵ and R⁶ are each, independently of one another, halogen, cyano, nitro, alkyl, aryl, alkylamino, dialkylamino, alkoxy, aryloxy, arylthio, alkylthio, SO₃H, SO₂NR⁷R⁸ CO₂R¹², CONR⁷R⁸, NH-COR¹² or a radical -(B)_m-D,

B is a bridge member selected from the group consisting of a direct bond, CH₂, CO, CH(alkyl), C(alkyl)₂, NH, S, O or -CH=CH-, where (B)_m is a chemically meaningful sequence of bridge members B with m = 1 to 10, preferably 1,

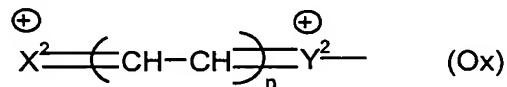
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D is the monovalent radical of a redox system of the formula



10

or



15

or a metallocenyl radical or a metallocenylcarbonyl radical, with possible metal centres being titanium, manganese, iron, ruthenium or osmium,

X¹ and X² are each, independently of one another, NR'R'', OR'' or SR'',

Y¹ is NR', O or S,

20

Y² is NR',

n is from 1 to 10 and

25

R' and R'' are each, independently of one another, hydrogen, alkyl, cycloalkyl, aryl or hetaryl or form a direct bond or bridge to one of the carbon atoms of the $\overline{\left(\begin{array}{c} \text{CH}=\text{CH} \\ \diagup \quad \diagdown \\ \text{---} \end{array} \right)_n}$ or $\overline{\equiv \text{CH}-\text{CH}\equiv}_n$ chain,

w, x, y and z are each, independently of one another, from 0 to 4, and
 $w+x+y+z \leq 12$,

R is alkyl or aryl,

5

R⁷ and R⁸ are each, independently of one another, hydrogen, alkyl, aryl or R⁷ and R⁸ together with the N atom to which they are bound form a heterocyclic 5-, 6- or 7-membered ring, if desired with participation of further heteroatoms, in particular heteroatoms selected from the group consisting of O, N and S, where NR⁷R⁸ is, in particular, pyrrolidino, piperidino or morpholino,

10

R¹⁰ and R¹¹ are each, independently of one another, hydrogen, alkyl, aryl or R¹⁰ and R¹¹ together with the O or S atom to which they are bound form an aromatic, pseudoaromatic, partially hydrogenated or perhydrogenated heterocyclic 5-, 6- or 7-membered ring, if desired with participation of further heteroatoms, in particular heteroatoms selected from the group consisting of O, N and S,

15

20

R¹² is alkyl, aryl, hetaryl or hydrogen,

25

R¹⁷, R¹⁸ and R¹⁹ are each, independently of one another, hydrogen, alkyl, aryl, hetaryl or NR¹⁷R¹⁸R¹⁹ is an aromatic, pseudoaromatic, partially hydrogenated or perhydrogenated heterocyclic 5-, 6- or 7-membered ring, if desired with participation of further heteroatoms, in particular heteroatoms selected from the group consisting of O, N und S.

30

3. Optical data carrier according to Claim 2, characterized in that the light-writable information layer comprises at least one Co phthalocyanine of the formula I in which the radicals R¹ to R⁸ and R, R', R'' and R¹⁰ to R¹² and R¹⁷ to R¹⁹ are:

substituents of the "alkyl" type, C₁-C₁₆-alkyl, in particular C₁-C₆-alkyl, which may be substituted by halogen such as chlorine, bromine, fluorine, hydroxy, cyano and/or C₁-C₆-alkoxy;

5

substituents of the "alkoxy" type, C₁-C₁₆-alkoxy, in particular C₁-C₆-alkoxy, which may be substituted by halogen such as chlorine, bromine, fluorine, hydroxy, cyano and/or C₁-C₆-alkyl;

10

substituents of the "cycloalkyl" type, preferably C₄-C₈-cycloalkyl, in particular C₅-C₆-cycloalkyl, which may be substituted by halogen such as chlorine, bromine or fluorine, hydroxy, cyano and/or C₁-C₆-alkyl;

15

substituents of the "alkenyl" type, preferably C₆-C₈-alkenyl, which may be substituted by halogen such as chlorine, bromine or fluorine, hydroxy, cyano and/or C₁-C₆-alkyl, with particular preference being given to alkenyl being allyl;

20

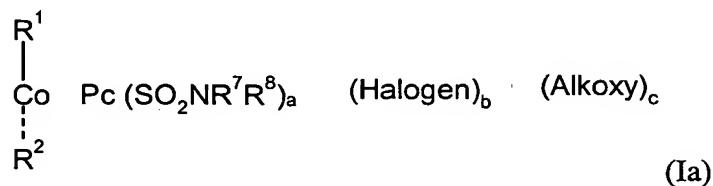
substituents of the "hetaryl" type, preferably heterocyclic radicals having 5- to 7-membered rings, which preferably contain heteroatoms from the group consisting of N, S and/or O and may be fused with aromatic rings or may bear further substituents, for example halogen, hydroxy, cyano and/or alkyl, with particularly preferred heteraryl radicals being: pyridyl, furyl, thieryl, oxazolyl, thiazolyl, imidazolyl, quinolyl, benzoxazolyl, benzothiazolyl or benzimidazolyl;

25

substituents of the "aryl" type, preferably C₆-C₁₀-aryl, in particular phenyl or naphthyl, which may be substituted by halogen, e.g. F, Cl, hydroxy, C₁-C₆-alkyl, C₁-C₆-alkoxy, NO₂ and/or CN.

30

4. Optical data carriers according to Claim 1, characterized in that the Co phthalocyanine corresponds to the formula Ia



5 where

Halogen is chlorine, bromine or fluorine,

10 Alkoxy is C₁-C₈-alkoxy which may be substituted, and a is from 0 to 4, b is from 0 to 10, c is from 0 to 8, where the sum of a, b and c is ≤ 12 and

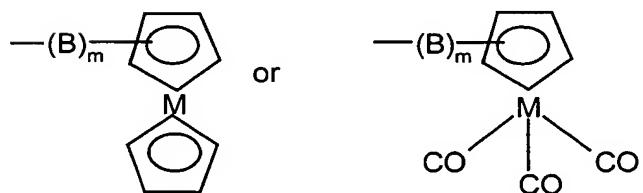
R¹, R², R⁷, R⁸, and CoPc are as defined in Claim 2.

15 5. Optical data carriers according to Claim 2, characterized in that the light-writable information layer comprises at least one Co phthalocyanine of the formula I in which

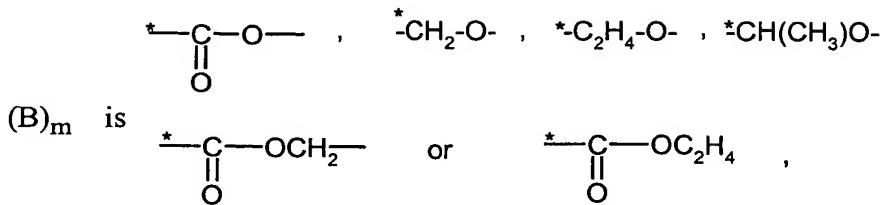
20 R³, R⁴, R⁵ and R⁶ are each, independently of one another, chlorine, fluorine, bromine, iodine, cyano, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, tert-butyl, pentyl, tert-amyl, hydroxyethyl, 3-dimethylaminopropyl, 3-diethylaminopropyl, phenyl, p-tert-butylphenyl, p-methoxyphenyl, isopropylphenyl, trifluoromethylphenyl, naphthyl, methylamino, ethylamino, propylamino, isopropylamino, butylamino, isobutylamino, tert-butylamino, pentylamino, tert-amylamino, benzylamino, methylphenylhexylamino, hydroxyethylamino, aminopropylamino, aminoethylamino, 3-dimethylaminopropylamino, 3-diethylaminopropylamino, diethylaminoethylamino,

25

	dibutylaminopropylamino,	morpholinopropylamino,
	piperidinopropylamino,	pyrrolidinopropylamino,
	pyrrolidonopropylamino, 3-(methylhydroxyethylamino)propylamino,	
	methoxyethylamino, ethoxyethylamino, methoxypropylamino,	
5	ethoxypropylamino, methoxyethoxypropylamino, 3-(2-ethylhexyloxy)propylamino, isopropyloxypropylamino, dimethylamino, diethylamino,	
	diethanolamino, dipropylamino, diisopropylamino,	
10	dibutylamino, diisobutylamino, di-tert-butylamino, dipentylamino, di-tert-amylamino, bis(2-ethylhexyl)amino, bis(aminopropyl)amino,	
	bis(aminoethyl)amino, bis(3-dimethylaminopropyl)amino, bis(3-Diethylaminopropyl)amino,	bis(diethylaminoethyl)amino,
	bis(dibutylaminopropyl)amino,	di(morpholinopropyl)amino,
	di(piperidinopropyl)amino,	di(pyrrolidinopropyl)amino,
	di(pyrrolidonopropyl)amino,	bis(3-
15	(methylhydroxyethylamino)propyl)amino, dimethoxyethylamino, diethoxyethylamino, dimethoxypropylamino, diethoxypropylamino, di(methoxyethoxyethyl)amino, di(methoxyethoxypropyl)amino, bis(3-(2-ethylhexyloxy)propyl)amino, di(isopropyloxyisopropyl)amino,	
	methoxy, ethoxy, propyloxy, isopropyloxy, butyloxy, isobutyloxy, tert-butyloxy, pentyloxy, tert-amyloxy, methoxyethoxy, ethoxyethoxy, methoxypropyloxy, ethoxypropyloxy, methoxyethoxypropyloxy, 3-(2-ethylhexyloxy)propyloxy, phenyl, methylthio, ethylthio, propylthio, isopropylthio, butylthio, isobutylthio, tert-butylthio, pentylthio, tert-amylthio, methoxyphenyl, trifluoromethylphenyl, naphthyl, CO ₂ R ¹² ,	
20	CONR ⁷ R ⁸ , NH-COR ¹² , SO ₃ H, SO ₂ NR ⁷ R ⁸ or a radical of the formula	
25		



where



where the asterisk (*) denotes the linkage to the 5-membered ring,

5

w, x, y and z are each, independently of one another, from 0 to 4 and
 $w+x+y+z \leq 12$,

NR⁷R⁸ is amino, methylamino, ethylamino, propylamino, isopropylamino,
 10 butylamino, isobutylamino, tert-butylamino, pentylamino, tert-
 amyramino, benzylamino, methylphenylhexylamino, 2-ethyl-1-
 hexylamino, hydroxyethylamino, aminopropylamino,
 Aminoethylamino, 3-dimethylaminopropylamino, 3-diethyl-
 aminopropylamino, morpholinopropylamino, piperidinopropylamino,
 15 pyrrolidinopropylamino, pyrrolidonopropylamino, 3-
 (methylhydroxyethylamino)propylamino, methoxyethylamino,
 ethoxyethylamino, methoxypropylamino, ethoxypropylamino,
 methoxyethoxypropylamino, 3-(2-ethylhexyloxy)propylamino,
 isopropyloxyisopropylamino, dimethylamino, diethylamino,
 20 dipropylamino, diisopropylamino, dibutylamino, diisobutylamino, di-
 tert-butylamino, dipentylamino, di-tert-amylamino, bis(2-
 ethylhexyl)amino, dihydroxyethylamino, bis(aminopropyl)amino,
 bis(aminoethyl)amino, bis(3-dimethylaminopropyl)amino, bis(3-
 diethylaminopropyl)amino, di(morpholinopropyl)amino,
 25 di(piperidinopropyl)amino, di(pyrrolidinopropyl)amino, di-
 (pyrrolidonopropyl)amino, bis(3-methylhydroxyethylamino)propylamino,
 dimethoxyethylamino,

diethoxyethylamino, dimethoxypropylamino, diethoxypropylamino,
di(methoxyethoxypropyl)amino, bis(3-(2-ethylhexyloxy)propyl)amino,
di(isopropyloxyisopropyl)amino, anilino, p-toluidino, p-tert-
butylanilino, p-anisidino, isopropylanilino or naphthylamino or
5 NR⁷R⁸, in particular, is pyrrolidino, piperidino, piperazino or
morpholino,

10 R¹² is hydrogen, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, tert-
butyl, pentyl, tert-amyl, phenyl, p-tert-butylphenyl, p-methoxyphenyl,
isopropylphenyl, p-trifluoromethylphenyl, cyanophenyl, naphthyl, 4-
pyridinyl, 2-pyridinyl, 2-quinolinyl, 2-pyrrolyl or 2-indolyl,

15 NR¹⁷R¹⁸R¹⁹ is ammonia, methylamine, ethylamine, propylamine,
isopropylamine, butylamine, isobutylamine, tert-butylamine,
pentylamine, tert-amylamine, benzylamine, methylphenylhexylamine,
2-ethyl-1-hexylamine, hydroxyethylamine, aminopropylamine,
aminoethylamine, 3-dimethylaminopropylamine, 3-diethylamino-
propylamine, morpholinopropylamine, piperidinopropylamine,
20 pyrrolidinopropylamine, pyrrolidonopropylamine, 3-(methylhydroxy-
ethylamino)propylamine, methoxyethylamine, ethoxyethylamine,
methoxypropylamine, ethoxypropylamine,
methoxyethoxypropylamine, 3-(2-ethylhexyloxy)propylamine,
isopropyloxyisopropylamine, dimethylamine, diethylamine,
dipropylamine, diisopropylamine, dibutylamine, diisobutylamine, di-
25 tert-butylamine, dipentylamine, di-tert-amylamine, bis(2-
ethylhexyl)amine, dihydroxyethylamine, bis(aminopropyl)amine,
bis(aminoethyl)amine, bis(3-dimethylaminopropyl)amine, bis(3-
diethylaminopropyl)amine, di(morpholinopropyl)amine, di(piperidino-
propyl)amine, di(pyrrolidinopropyl)amine, di-
30 (pyrrolidonopropyl)amine, bis(3-(methylhydroxyethylamino)propyl)amine, dimethoxyethylamine,

diethoxyethylamine, dimethoxypropylamine, diethoxypropylamine,
di(methoxyethoxypropyl)amine, bis(3-(2-ethylhexyloxy)propyl)amine,
di(isopropyloxyisopropyl)amine, trimethylamine, triethylamine,
tripropylamine, triisopropylamine, tributylamine, triisobutylamine, tri-
5 tert-butylamine, tripentylamine, tri-tert-amylamine, tris(2-
ethylhexyl)amine, trihydroxyethylamine, tris(aminopropyl)amine,
tris(aminoethyl)amine, tris(3-dimethylaminopropyl)amine, tris(3-
diethylaminopropyl)amine, tri(morpholinopropyl)amine,
tri(piperidinopropyl)amine, tri(pyrrolidinopropyl)amine, tri-
10 (pyrrolidonopropyl)amine, tris(3-(methylhydroxyethylamino)propyl)amine, trimethoxyethylamine,
triethoxyethylamine, trimethoxypropylamine, triethoxypropylamine,
tri(methoxyethoxypropyl)amine, tris(3-(2-
ethylhexyloxy)propyl)amine, tri(isopropyloxyisopropyl)amine, anilin,
15 p-toluidine, p-tert-butylaniline, p-anisidine, isopropylaniline,
naphthylamine, pyridine, pyridazine, pyrimidine, pyrazine, triazine,
oxazine, pyrrole, pyrazole, imidazole, quinoline, pyrrolidine,
piperidine, piperazine or morpholine,

20 OR¹⁰R¹¹ is water, methanol, ethanol, propanol, isopropanol, butanol,
isobutanol, tert-butanol, pentanol, tert-amylalcohol, 3-(2,4-
dimethyl)pentanol, methoxyethanol, ethoxyethanol, methoxypropanol,
ethoxypropanol, methoxyethoxypropanol, 3-(2-
ethylhexyloxy)propanol, diacetone alcohol, phenol, tetrahydrofuran,
25 furan or oxazole,

SR¹⁰R¹¹ is hydrogen sulphide, methyl thiol, ethyl thiol, propyl thiol, isopropyl
thiol, butyl thiol, isobutyl thiol, tert-buyl thiol, pentyl thiol, tert-amyl
thiol, 3-(2,4-dimethyl)pentyl thiol, methoxyethyl thiol, ethoxyethyl
thiol, methoxypropyl thiol, ethoxypropyl thiol, methoxyethoxypropyl

thiol, 3-(2-ethylhexyloxy)propyl thiol, diacetone thiol, thiophenol, tetrahydrothiofuran, thifuran or oxathiazole,

where

5

the alkyl, alkoxy, aryl and heterocyclic radicals may, if desired, bear further radicals such as alkyl, halogen, hydroxy, hydroxyalkyl, amino, alkylamino, dialkylamino, nitro, cyano, CO-NH₂, alkoxy, alkoxycarbonyl, morpholino, piperidino, pyrrolidino, trialkylsilyl, trialkylsiloxy or phenyl, the alkyl and/or alkoxy radicals can be saturated, unsaturated, linear or branched, the alkyl radicals may be partially halogenated or perhalogenated, the alkyl and/or alkoxy radicals may be ethoxylated or propoxylated or silylated and adjacent alkyl and/or alkoxy radicals on aryl or heterocyclic radicals may together form a three- or four-membered bridge.

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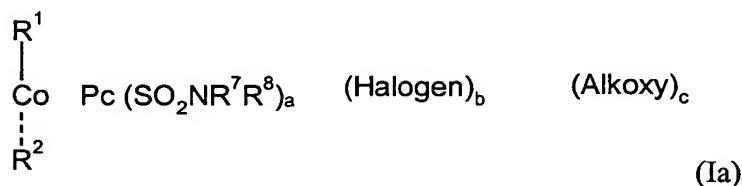
6. Optical data carriers according to Claim 2, characterized in that the light-writable information layer additionally contains a metal-containing or metal-free phthalocyanine which is different from (I) and in which the central atom is selected from the group consisting of: Si, Zn, Al, Cu, Pd, Pt, Au and Ag, in particular Cu or Pd.
7. Optical data carriers having an information layer which has been written on, obtainable by writing on the optical data carrier according to Claim 1 by means of light having a wavelength of from 700 to 830 nm, preferably 750-800 nm.
8. Process for producing the optical data carriers as claimed in Claim 1, characterized in that a Co(III) phthalocyanine in which the Co metal centre bears an axial substituent R¹ and an axial coordinated ligand R², where R¹ is CN, SCN, halogen, in particular Cl, Br or F, alkoxy, aryloxy, arylthio or alkylthio and R² is no ligand or a substituted or unsubstituted amine, water,

20
25
30

an alcohol, H₂S, a thioalcohol or an isonitrile, is applied as light-absorbent compound to the substrate of the optical data carrier.

9. Use of Co phthalocyanines of the formula (I) as light-absorbent compounds in
5 the light-writable information layer of optical data stores.

10. Compounds of the formula Ia



10 where

Halogen is chlorine, bromine or fluorine,

15 Alkoxy is C₁-C₈-alkoxy which may be substituted, and a is from 0 to 4, b is from 0 to 10, c is from 0 to 8, where the sum of a, b and c is ≤ 12 and

R¹, R², R⁷, R⁸, and CoPc are as defined in Claim 2.

20 11. Process for preparing the compound according to Claim 10, characterized in that substituted or unsubstituted Co phthalocyanine of the formula (IIa)

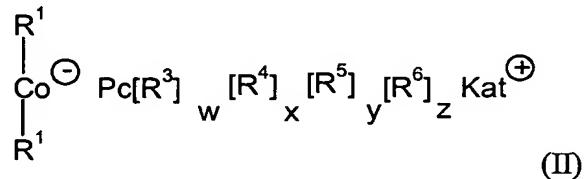


25 is oxidized, subsequently reacted with KatCN, KatSCN, Kat halide, Kat alkoxide or Kat alkylthiolate and, if desired the product is reacted further with NR¹⁷R¹⁸R¹⁹, OR¹⁰R¹¹, SR¹⁰R¹¹ or an isonitrile of the formula $\text{C}\equiv\text{N}-\text{R}$ at a

temperature of 30-100°C, R¹⁷, R¹⁸, R¹⁹, R¹⁰, R¹¹, and R are as defined in Claim 2 and Kat is a lithium cation, sodium cation, potassium cation, tetrabutylammonium cation, tetrapropylammonium cation, tetraethylammonium cation, tetramethylammonium cation, triethyloxonium cation, 5 triphenylcarbenium cation, diphenyliodonium cation, N-ethylpyridinium cation or ferrocenyl cation.

12. Mixtures comprising

- 10 a) a Co(III) phthalocyanine of the formula I having an axial substituent R¹, and an axial ligand R²,
- c) a phthalocyanine which is different from a) and has the formula II



15 where R¹, R³, R⁴, R⁵, R⁶ w, x, y, z and CoPc are as defined in Claim 2 and Kat+ is a lithium cation, sodium cation, potassium cation, tetrabutylammonium cation, tetrapropylammonium cation, tetraethylammonium cation, tetramethylammonium cation, triethyloxonium cation, triphenylcarbenium cation, diphenyliodonium cation, N-ethylpyridinium cation or ferrocenyl cation.

- 20 13. Mixture containing at least 50% by weight of a Co(III) phthalocyanine of the formula I having an axial substituent R¹ and a coordinated ligand R², where R¹ and R² are as defined in Claim 2.

- 25 14. Solutions containing dyes of the formula (I) having an axial substituent R¹ and a coordinated ligand R², where R¹ and R² are as defined in Claim 2, or contain mixtures as claimed in Claim 12 containing, as solvent, propanol, 2,2,3,3-tetrafluoropropanol, butanol, in particular 1-butanol, or mixtures of

these with diacetone alcohol or nonanol, in particular 1-nananol, preferably 80-100% by weight of propanol, 2,2,3,3-tetrafluoropropanol and/or butanol and 0-20% by weight of diacetone alcohol or nonanol, in each case based on the total solvent content.

5

15. Process according to Claim 8, characterized in that the light-absorbent compound is applied in the form of a solution to the substrate by means of spin coating, where propanol, 2,2,3,3-tetrafluoropropanol, butanol, in particular 1-butanol, or mixtures of these with diacetone alcohol or nonanol, in particular 1-nananol, preferably 80-100% by weight of propanol, 2,2,3,3-tetrafluoropropanol and/or butanol and 0-20% by weight of diacetone alcohol or nonanol, is used as solvent, with the percentages in each case being based on the total solvent content.
- 10